

**REMARKS/ ARGUMENTS**

Claims 1, 3, 8, and 16 to 20 were rejected under 35 U.S.C. 102(b) as being anticipated by Vidalin (US 2002/0085963 A1). Claims 1, 6, 7 and 10 were rejected under 35 U.S.C. 102(e) as being anticipated by Barbir (US 2004/0142215 A1). Claim 2 was rejected under 35 U.S.C. 103(a) as being unpatentable over Barbir in view of Michelfelder (US 4,461,224). Claim 4 was rejected under 35 U.S.C. 103(a) as being unpatentable over Barbir in view of Faye (US 2003/0170514). Claims 9 and 11 to 15 were rejected under 35 U.S.C. 103(a) as being unpatentable over Barbir in view of Keefer (US 2002/0098394 A1).

Reconsideration of the application based on the following remarks is respectfully requested.

**Rejection under 35 U.S.C. §102(b)**

Claims 1, 3, 8, and 16 to 20 were rejected under 35 U.S.C. 102(b) as being anticipated by Vidalin (US 2002/0085963 A1).

Vidalin discloses a system for synthesizing acetic acid from carbon monoxide and methanol (see Figure 2).

Claim 1 recites “[a] gas generating system, comprising:  
a reformer for producing a hydrogen-containing reformate gas using raw materials, at least a first of the raw materials containing carbon and hydrogen;  
a separator device configured to selectively separate the hydrogen-containing reformate gas into hydrogen and a residual gas, the separator device including at least one diaphragm selectively permeable for hydrogen;  
a recirculation system for recirculating an amount of the residual gas from a first location downstream of the separator device to a second location upstream from the separator device.”

It is respectfully submitted that Vidalin does not show “the separator device including at least one diaphragm selectively permeable for hydrogen” as required by

claim 1. The Examiner asserts at page 4 of the Office Action that CO<sub>2</sub> removal unit 22 of Vidalin is “a separator device configured to selectively separate the hydrogen-containing reformatre gas into hydrogen and a residual gas” as recited in claim 1. The Examiner then asserts at page 4 of the Office Action that Vidalin, at paragraph [0056], discloses that the asserted separator device, CO<sub>2</sub> removal unit 22, includes at least one diaphragm selectively permeable for hydrogen. However, paragraph [0056] refers solely to separation unit 28, not CO<sub>2</sub> removal unit 22, and Vidalin does not in any way indicate that CO<sub>2</sub> removal unit 22 includes at least one diaphragm selectively permeable for hydrogen. In Vidalin, CO<sub>2</sub> removal unit 22 separates the stream from line 20 using CO<sub>2</sub> absorption stripping process, not at least one diaphragm selectively permeable for hydrogen. (Paragraph [0051]). Thus, Vidalin does not disclose all the elements of claim 1 and cannot anticipate claim 1.

Withdrawal of the rejection under 35 U.S.C. §102 (b) of claims 1, 3, 8 and 16 to 20 is respectfully requested.

Rejection under 35 U.S.C. §102(e)

Claims 1, 6, 7 and 10 were rejected under 35 U.S.C. 102(e) as being anticipated by Barbir (US 2004/0142215 A1).

Barbir discloses an electrochemical hydrogen compressor for an electrochemical cell system. A fuel cell with a fuel cell hydrogen inlet and a fuel cell hydrogen outlet is shown. (Abstract). Unconsumed hydrogen that is exhausted from the fuel cell is compressed by the electrochemical hydrogen compressor and recirculated back to the hydrogen inlet. (Paragraph [0022]). The compressor may also be used to recirculate hydrogen back into a fuel cell when hydrogen is exhausted from the fuel as a reformatre, a mixture of gases. To avoid “the lowering of the hydrogen concentration at the cell stack inlet, which in turn may result in the loss in voltage across the cell stack and decreased power and efficiency,” the compressor “allows for recirculation of the hydrogen constituent of the reformatre gas while not recirculating the other gases of the reformatre.” (Paragraph [0042]).

Claim 1 recites “[a] gas generating system, comprising:

a reformer for producing a hydrogen-containing reformate gas using raw materials, at least a first of the raw materials containing carbon and hydrogen;

a separator device configured to selectively separate the hydrogen-containing reformate gas into hydrogen and a residual gas, the separator device including at least one diaphragm selectively permeable for hydrogen;

a recirculation system for recirculating an amount of the residual gas from a first location downstream of the separator device to a second location upstream from the separator device.”

It is respectfully submitted that Barbir does not disclose “the separator device including at least one diaphragm selectively permeable for hydrogen,” as recited in claim 1. Barbir simply discloses that a diaphragm pump can act as a mechanism to drive hydrogen gas out of a fuel cell. (Paragraph [0031]). It is respectfully submitted that Barbir does not expressly disclose that the diaphragm pump includes a diaphragm which is selectively permeable for hydrogen. Furthermore, the Examiner has not provided any evidence that Barbir inherently includes a diaphragm pump having a diaphragm selectively permeable for hydrogen. “To establish inherency, the extrinsic evidence ‘must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.’ ” (MPEP 2112) (emphasis added).

It is also respectfully submitted that the pump of Barbir does not have a selectively permeable diaphragm, but rather must be impermeable to hydrogen to be able to pump it. A diaphragm pump is a well known mechanical pump in which a diaphragm is pushed and pulled to increase and decrease the volume in a head of the pump to compress gases or fluids therein and force them out of the pump. Thus, a diaphragm pump would not effectively force hydrogen out of the pump if the pump included a diaphragm which is selectively permeable for hydrogen.

It is also respectfully submitted that Barbir does not disclose the requirement of a “separator device including at least one diaphragm selectively permeable for hydrogen” of claim 1 because the only diaphragm pump disclosed Barbir, at paragraph [0031], is an alternative to an electrochemical hydrogen compressor of Barbir, which the Examiner asserts corresponds to the claimed “separator device.” Paragraph [0031] of Barbir *clearly* indicates that the diaphragm pump of Barbir is an alternative to the electrochemical hydrogen compressor for recirculating unconsumed hydrogen gas to remove water accumulated at the anode and therefore is not included in the electrochemical hydrogen compressor. The electrochemical hydrogen compressor of Barbir separates hydrogen from byproducts of the reformate by applying a direct current across a proton exchange membrane, not by using at least one diaphragm selectively permeable for hydrogen. (See paragraph [0033]). This is another reason why Barbir does not disclose the “separator device” of claim 1.

Withdrawal of the rejection under 35 U.S.C. §102 (e) of claims 1, and claim 6, 7 and 10, dependent on claim 1, is respectfully requested.

Rejections under 35 U.S.C. §103(a)

Claim 2 was rejected under 35 U.S.C. 103(a) as being unpatentable over Barbir in view of Michelfelder (US 4,461,224).

Barbir is described above.

Michelfelder discloses “a method of treating reaction products which result from the flame combustion of fuels containing contaminants such as sulfur, chlorine, and fluorine compounds, and ash.” (abstract).

Claim 2 recites “the gas generation system as recited in claim 1, wherein the second location is directly in front of the separator device.”

In view of arguments presented above with respect to why Barbir does not anticipate claim 1, withdrawal of the rejection to claim 2 is respectfully requested.

Furthermore, one of skill in the art would not have modified Barbir in view of Michelfelder. Michelfelder does not involve reforming of fuel, but rather treating reaction products resulting from the combustion of fuel to reduce contaminants emitted into the environment. (Abstract). Therefore, there would have been no reason for one skilled in the art of fuel generation to modify Barbir in view of Michelfelder to meet the limitations of claim 2.

Claim 4 was rejected under 35 U.S.C. 103(a) as being unpatentable over Barbir in view of Faye (US 2003/0170514).

Barbir is described above.

Faye discloses “a fuel cell device with a fuel cell unit and a conversion unit for converting fuel mixtures into a hydrogen-containing fluid stream.” (Paragraph [0002]).

Claim 4 recites “the gas generation system as recited in claim 1, further comprising an enrichment device configured to enrich the hydrogen-containing reformatte gas with hydrogen and disposed between the reformer and the separator devices, wherein the second location is between the reformer and the enrichment device.”

In view of arguments presented above with respect to why Barbir does not anticipate claim 1, withdrawal of the rejection to claim 4 is respectfully requested.

Also, neither Faye nor Barbir discloses the limitation that “the second location is between the reformer and the enrichment device,” as required in claim 4. It is respectfully submitted, that it is not possible for Faye to teach that the “second location is between the reformer and the enrichment device” when Faye does not disclose, and in fact teaches away from, recirculating residual gases. Faye discloses discharging residual gases into the atmosphere, and not recirculating them. (Paragraph [0038]).

Claims 9 and 11 to 15 were rejected under 35 U.S.C. 103(a) as being unpatentable over Barbir in view of Keefer (US 2002/0098394 A1).

In view of arguments presented above with respect to why Barbir does not anticipate claim 1, withdrawal of the rejection to claims 9, and 11 to 15 is respectfully requested.

**CONCLUSION**

The present application is respectfully submitted as being in condition for allowance and applicants respectfully request such action.

Respectfully submitted,

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